

ENERGIZE MISSOURI

MISSOURI DEPARTMENT OF NATURAL RESOURCES

Residential Requirements for the 2009 IECC

Workshop 1:
Focus on Awareness and New Construction



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Introductions

Stephen Johnson

Project email:

energycodeworkshop@shawgrp.com

Code officials:

Name

Municipality

Status of Residential Codes



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Overview

Project funded by the Missouri Department of Natural Resources (MDNR) with American Recovery and Reinvestment Act of 2009 (ARRA) funding.

2 Locations:

- St. Louis
- Springfield

Objective of the Workshop: Work with municipalities and counties across the state to identify opportunities to adopt or enhance compliance with the 2009 International Energy Conservation Code (IECC) at a local level.



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Agenda

Topic	Approx. Time
Introduction, Project Background, Workshop Overview	15 minutes
Homeowner/Contractor Awareness of 2009 IECC	20 minutes
2009 IECC Highlights	30 minutes
Break	15 minutes
2009 IECC Highlights (cont.)	30 minutes
Resource Inventory	10 minutes
Summary/Questions	10 minutes
Total	2 hours 10 minutes



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Some Important Points

Overall

- Focused on residential
- Discussion-based
- Forum for ideas and practices

What can you expect?

- Code citations in []
- Printed slides
- Links to Department of Energy and Building Codes Assistance Program (BCAP) resources

Before we get started...

- Cell phones



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Topic 1

Awareness of the 2009 IECC



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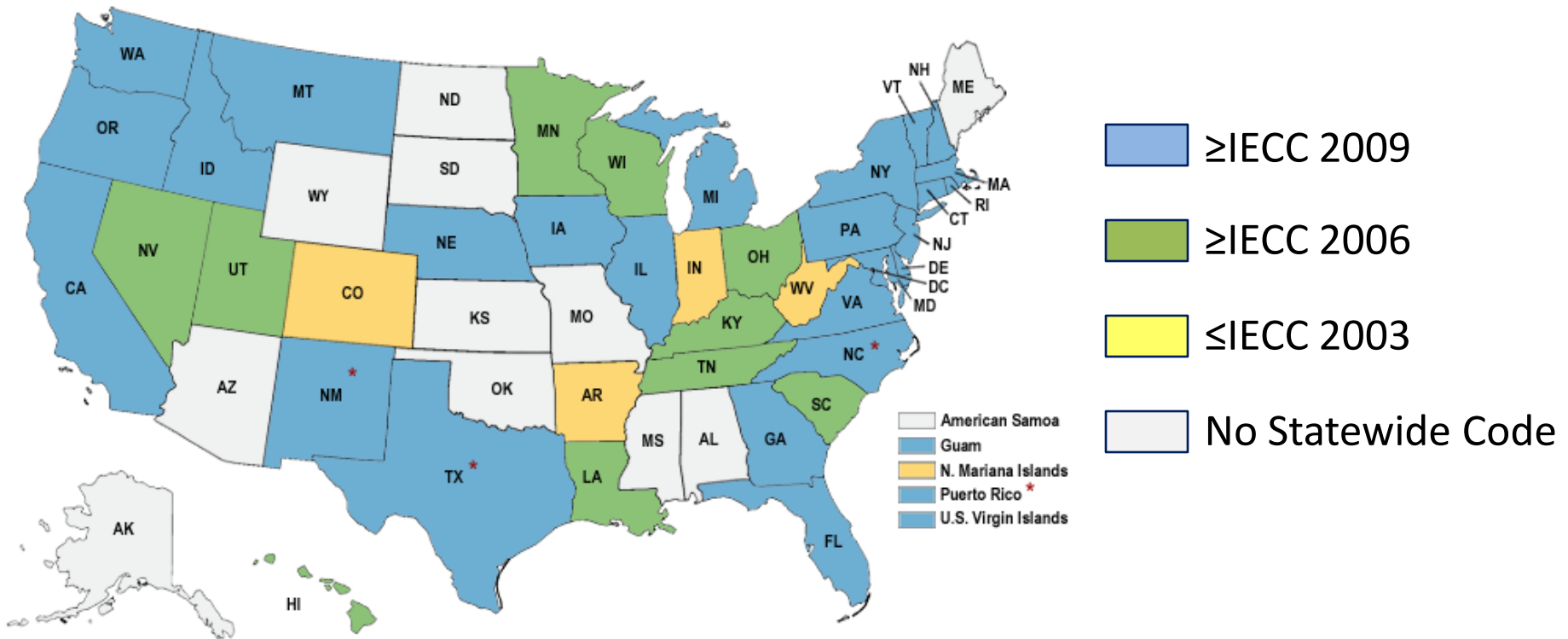
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Topic 1 Objectives

- Implementation of the code
- Identify benefits that result from adopting, implementing, and enforcing the 2009 IECC
 1. Municipality
 2. Homeowners
 3. Contractors
- Identify potential challenges from adopting, implementing, and enforcing the 2009 IECC
- Identify the cost impact to homeowners/contractors of compliance
- Identify options to promote awareness of the 2009 IECC

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Overview - Residential State Energy Code Status (*)



(*) as of November 1, 2011, DOE – Building Energy Codes Program

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Overview - Missouri Residential Energy Efficiency

State Level:

- No mandatory efficiency code

Local Level:

- St. Louis City and County – 2009 IECC
- Clay County – 2006 IRC
- Springfield – 2006 IRC with 2012 IRC hopeful in January

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Benefits of the 2009 IECC

Important points about energy codes

- Marketplace does not guarantee energy-efficiency
 - Upfront cost vs. long-term, operating costs
- Comfort
- Energy consumption and emissions
- New construction is a unique opportunity



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Benefits of the 2009 IECC - Municipality

In your opinion, what are the benefits to a municipality that result from adopting, implementing, and enforcing the 2009 IECC?

- What are the advantages of compliance with the 2009 IECC?
- What are disadvantages or risks of non-compliance?

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Benefits of the 2009 IECC - Municipality

- Optimal utilization of fossil fuels and non-renewable resources for communities¹
 - Reduces strain on energy and utility resources
- Create economic opportunities for business and industry by promoting new, energy-efficient technologies
- Shifts construction costs away from materials and towards labor²
 - Job creation/enhance skills of workforce

[1] International Code Council,

http://media.iccsafe.org/geo/docs/IECC_EnergyCodeSupportProgram-Overview.pdf

[2] Institute for Market Transformation, IMT Research on Jobs for Energy Codes

<http://www.imt.org/files/FileUpload/files/PDF/JobsFromEnergyCodesOnePager.pdf>



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Benefits of the 2009 IECC - Homeowner

In your opinion, what are the benefits to a homeowner that result from owning a home that complies with the 2009 IECC?

- What are the advantages of compliance with the 2009 IECC?
- What are disadvantages or risks of non-compliance?

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Benefits of the 2009 IECC - Homeowner

- Homeowners
- Utility savings
 - Average \$2,150/yr on home energy bills¹
 - Average savings ~ \$300/yr¹
- Improved thermal comfort
- Reduces the risk of long-term financial burden that can result from short-term design and construction decisions
 - Testing requirement, installation of “hidden” materials (e.g., insulation)

[1] Alliance to Save Energy, U.S. Household Energy Expenditures, 2010



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Benefits of the 2009 IECC - Contractor

In your opinion, what are the benefits to a contractor that result from building a home that complies with the 2009 IECC?

- What are the advantages of compliance with the 2009 IECC?
- What are disadvantages or risks of non-compliance?

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Benefits of the 2009 IECC - Contractor

- Customer satisfaction and recommendations
 - Increases comfort
 - Fewer call-backs
- Competitive advantage in the marketplace
 - Advertising can be used to explain energy-efficiency advantages
 - Can leverage available incentives and increase revenue
- Common basis for education and practice



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Topic 1 Objectives

- Identify benefits that result from implementing and enforcing the 2009 IECC
 1. Homeowners
 2. Contractors
 3. Municipality
- Identify potential challenges from implementing and enforcing the 2009 IECC
- Identify the cost impact to homeowners/contractors of compliance
- Identify options to promote awareness of the 2009 IECC
- Identify possible questions to test contractors' understanding

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Potential for Challenges of the 2009 IECC

Affected Professions¹:

- Architects
- Carpenters
- Brick masons, stonemasons, block masons
- Cement masons and concrete finishers
- Roofers
- Electricians
- Engineers
- Insulation Workers
- Energy modelers

[1] Institute for Market Transformation, IMT Research on Jobs for Energy Codes
<http://www.imt.org/files/FileUpload/files/PDF/JobsFromEnergyCodesOnePager.pdf>



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Potential for Challenges of the 2009 IECC

- Limited staff/availability to attend trainings
- Public perception of energy codes
- Accuracy and ability to enforce the code

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Potential for Challenges of the 2009 IECC

Builder/Contractor:

It's always been done this way...deal with it.

Builder/Contractor:

Come on, that's not necessary.

Builder/Contractor:

They won't pay for that price!

Homeowner:

I'd rather have the granite countertops...

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Topic 1 Objectives

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Costs of the 2009 IECC

- Analysis of Costs and Benefits of 2009 IECC
- Determine difference in construction costs and energy savings resulting from implementing IECC 2009 compared with the current practice
- The Building Codes Assistance Project (BCAP) estimates 18-26% in energy savings or annual savings between \$337-559 (compared with current practices), money that could be spent on upgrading their house or fed into the local communities

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Costs of the 2009 IECC

- Costs, savings and payback¹

	IECC 2009 vs. Current Practice
Incremental Construction Costs	\$1,608
Annual Energy Cost Savings	\$459
Simple Payback (years)	3.5

¹The Building Codes Assistance Project: Incremental Construction Cost Analysis for New Homes – Building to the 2009 IECC

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Costs of the 2009 IECC

- Mortgage Details

	IECC 2009 vs. Current Practice
Increase of a 20% Down Payment	\$322
Increase of Monthly Payment (30 year mortgage, 7% interest rate)	\$8.56
Average Monthly Energy Savings	\$38.25
Mortgage Becomes Cash Positive	11 months

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Promoting Awareness of 2009 IECC

- Where is our municipality relative to our neighbors?
- Utilizing your municipality's website
- Distributing handouts to applicants as early as possible



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Promoting Awareness of 2009 IECC

General Resources

- [Top 10 Reasons for Building Energy Codes](#), U.S. Dept. of Energy
- [Duct Leakage Frequently-Asked Questions](#), U.S. Dept. of Energy
- [Bigger is not always better with HVAC systems](#), U.S. Dept. of Energy
- These and other sources are included in a resource inventory (spreadsheet)



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Promoting Awareness of 2009 IECC

Contractor awareness

- Inform contractors with the energy code
 - Create cheat sheet, require short training, or quiz contractors
- Identify and address knowledge gaps upfront to enhance compliance with the 2009 IECC
- Possible to require registration
- Create opportunities to promote awareness



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Assessing Contractors on the 2009 IECC

Summary of Mechanical Requirements

- Size and select appropriate heating and cooling systems – submit documents to city prior to installation
- Seal all duct connections
- Do not use cavities for supply ducts
- Install furnace and ducts in conditioned space
- If ducts cannot be fully located in conditioned space
 - Insulate supply ducts to R-8 and all others to R-6
 - Test for duct tightness and meet requirements



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Topic 1 Summary

- There are several benefits that result from energy codes, to all stakeholders
- The challenges of implementing the 2009 IECC can easily be overcome
- The payback for compliance is less than five years
- There are several options available which municipalities can use to promote awareness of the 2009 IECC
- Look for ways to inform contractors of the 2009 IECC requirements

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Topic 2

Highlights of the Residential portion of the
2009 IECC



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Topic 2 Objectives

- Overview
- Compliance
 - Mandatory Provisions
- Compliance Paths
 - Prescriptive [402.1]
 - U-Factor [402.1.3]
 - UA Alternative [402.1.4]
 - Simulated Performance Alternative [405]

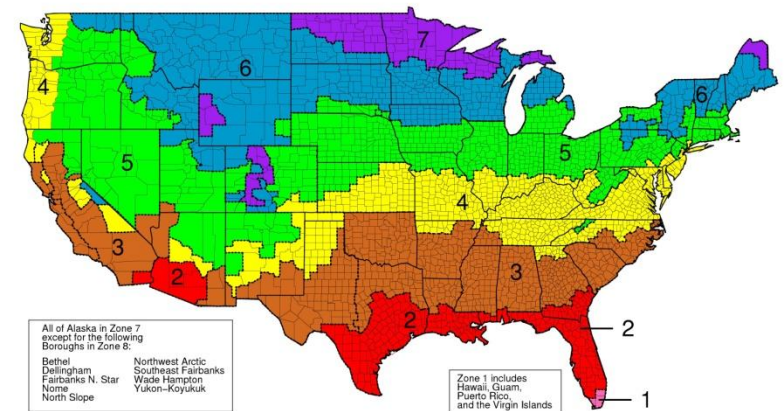
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Overview

2009 IECC

- Chapter 1 - Administration
- Chapter 2 - Definitions
- Chapter 3 - General Requirements
- Chapter 4 - Residential Energy Efficiency
- Chapter 5 - Commercial Energy Efficiency
- Chapter 6 - Referenced Standards



[301]

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Overview

RESIDENTIAL BUILDING. For this code, includes R-3 buildings, as well as R-2 and R-4 buildings three stories or less in height above grade.

- Single family house
- Duplex/townhouse
- Triplex (or larger units if 3 stories or less in height above grade)
- Apartment Buildings (if 3 stories or less in height above grade)
- Assisted Living Communities (if 3 stories or less in height above grade)

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Overview

COMMERCIAL BUILDING. For this code, all buildings that are not included in the definition of “Residential buildings.”

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Overview

- An 10 unit, 2 story apartment complex?
- References the IBC (IRC is for one- and two-family dwellings or townhouses)
- Still the residential portion of the IECC per the ICC definitions

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Overview

Relationship between IRC (International Residential Code) and IECC

- IECC addresses only energy (commercial and residential)
- IRC addresses all topics (structural, plumbing, etc.)
- IRC allows compliance with IECC as an alternative to Chapter 11 [N1101.2]
 - Energy requirements in IRC and IECC almost identical
 - IRC has less stringent foundation requirements in northern zones
 - Other minor differences
 - IRC does not have a simulated performance alternative path

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Overview

Applicability

- Code applies to residential buildings
- New construction, additions, alterations, renovations or repairs
- Additions can comply alone or in combination with existing building

Exempted Buildings

- Existing buildings
- Buildings designated as historic
- Buildings (or portions of) that are neither heated or cooled (e.g. garage)

Exempted Alterations

- Eight exceptions for alterations



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Overview

8 Exceptions

1. Storm windows installed over (E) window.
2. Glass only replacements in an (E) window.
3. (E) cavities are filled with insulation.
4. (E) cavity is not exposed.
5. Roofing for roofs were neither the sheathing nor the insulation is exposed.
6. Replacement of (E) doors that
7. Alterations that replace less than 50% of the luminaires in a space.
8. Alterations that replace only the bulb and ballast w/in the (E) luminaires in a space.

The IECC “is not intended to abridge safety, health or environmental requirements contained in other applicable codes or ordinances.”

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Overview

Mandatory Provisions

- Air-seal house and install “tight” fixtures in the building envelope
- Programmable thermostat must be installed for each system
- Ducts must be sealed and building cavities may not be supply ducts
- If ducts are not in conditioned space they must be verified to be “tight”
- Heating and cooling equipment shall be sized to ACCA Manual J and S
- There are others but the above are the main items

ACCA - Air Conditioning Contractors of America
Manual J – Residential Load Calculation
Manual S – Residential Equipment Selection



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Overview

Two options [402.4.2] to meet the building envelope tightness and verification

- Testing option [402.4.2.1]
- Visual Inspection option [402.4.2.2], using Table 402.4.2 *Air Barrier and Insulation Inspection Component Criteria*

BEST PRACTICE: Testing is now required in the 2012 IECC. Third party testing might be easier than inspectors trusting builders and/or verifying each item on the checklist.

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Overview

TABLE 402.4.2
AIR BARRIER AND INSULATION INSPECTION COMPONENT CRITERIA

COMPONENT	CRITERIA
Air barrier and thermal barrier	Exterior thermal envelope insulation for framed walls is installed in substantial contact and continuous alignment with building envelope air barrier. Breaks or joints in the air barrier are filled or repaired. Air-permeable insulation is not used as a sealing material. Air-permeable insulation is inside of an air barrier.
Ceiling/attic	Air barrier in any dropped ceiling/soffit is substantially aligned with insulation and any gaps are sealed. Attic access (except unvented attic), knee wall door, or drop down stair is sealed.
Walls	Corners and headers are insulated. Junction of foundation and sill plate is sealed.
Windows and doors	Space between window/door jambs and framing is sealed.
Rim joists	Rim joists are insulated and include an air barrier.
Floors (including above-garage and cantilevered floors)	Insulation is installed to maintain permanent contact with underside of subfloor decking. Air barrier is installed at any exposed edge of insulation.
Crawl space walls	Insulation is permanently attached to walls. Exposed earth in unvented crawl spaces is covered with Class I vapor retarder with overlapping joints taped.

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Overview

Duct joints and seams:

- Sealed – mandatory requirement

If air handler and all ducts are fully located in conditioned space then

- No insulation
- No duct tightness test

BEST PRACTICE: Furnace and ducts in conditioned space

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Compliance

Mandatory Provisions

AND

Compliance Path

(Four Options)



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Compliance

Mandatory Provisions

AND

- A. Prescriptive
- B.1 U-Factor
- B.2 UA Alternative
- C. Simulated Performance Alternative

Prescriptive Approaches

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Compliance Path – Prescriptive Approaches

There are a few additional requirements when doing a prescriptive approach (Prescriptive, U-Factor, and UA Alternative)

1. Supply ducts in attics shall be insulated to a minimum of R-8. All other ducts (outside of the conditioned space) shall be insulated to a minimum of R-6.
2. A minimum of 50 percent of the lamps in permanently installed lighting fixtures shall be high-efficacy lamps.

Alternative: The Simulated Performance Alternative path:

- No requirement for high-efficacy lighting
- All ducts to be insulated to a minimum of R-6

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Compliance Path – Prescriptive Approaches

Lighting efficacy prescriptive requirement

- At least 50% of permanently installed lighting fixtures shall be high-efficacy [404.1]
- What is high-efficacy?
 - Defined in Chapter 2 Definitions - Compact fluorescent lamps, T-8 or smaller diameter linear fluorescent lamps, or lamps with a minimum efficacy of:
 - » 60 lumens per watt for lamps over 40 watts,
 - » 50 lumens per watt for lamps over 15 watts to 40 watts, and
 - » 40 lumens per watt for lamps 15 watts or less

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Compliance Path – Prescriptive

Allowances in the prescriptive path:

- One door (24 ft²) can be exempt of the prescriptive requirements (e.g. decorative main entry wood panel door)
- 15 ft² can be exempt of the prescriptive requirements (e.g. block glass in shower instead of typical code compliant window)
- 500 ft² or 20% of the ceiling area, whichever is less, can be reduced to R-30 when ceiling assembly does not allow sufficient space for the required insulation (e.g. small sun room with a vaulted ceiling that the structural engineer wants sized with 2x10 rafters)

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Compliance

Mandatory Provisions

AND

- A.

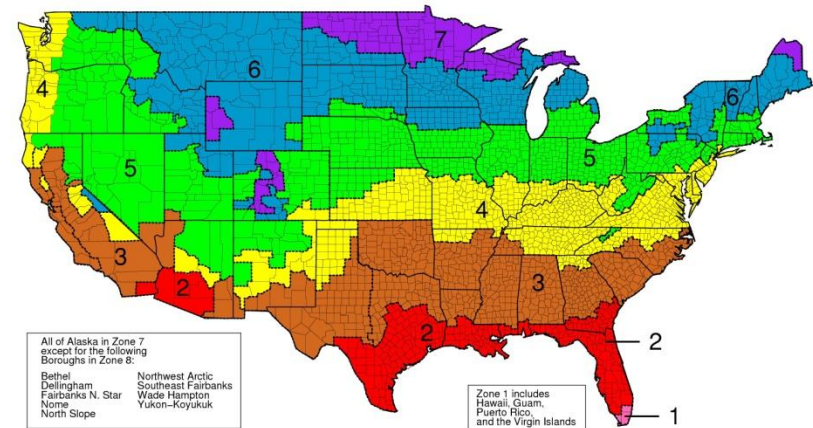
Prescriptive
 - B.1 U-Factor
 - B.2 UA Alternative
 - C. Simulated Performance Alternative
- Prescriptive Approaches*

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Compliance Path - Prescriptive

- R-values and U-factors dependent on climate zone
- *Insulation and Fenestration Requirements by Component* [Table 402.1.1]
- <http://energycode.pnl.gov/EnergyCodeReqs/>
- Could cite values directly from code
- No software needed
- No trade offs



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Compliance Path – Prescriptive

TABLE 402.1.1
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT^a

CLIMATE ZONE	FENESTRATION U-FACTOR ^b	SKYLIGHT ^b U-FACTOR	GLAZED FENESTRATION SHGC ^{b, e}	CEILING R-VALUE	WOOD FRAME WALL R-VALUE	MASS WALL R-VALUE ⁱ	FLOOR R-VALUE	BASEMENT ^c WALL R-VALUE	SLAB ^d R-VALUE & DEPTH	CRAWL SPACE ^c WALL R-VALUE
1	1.2	0.75	0.30	30	13	3/4	13	0	0	0
2	0.65 ^j	0.75	0.30	30	13	4/6	13	0	0	0
3	0.50 ^j	0.65	0.30	30	13	5/8	19	5/13 ^f	0	5/13
4 except Marine	0.35	0.60	NR	38	13	5/10	19	10/13	10, 2 ft	10/13
5 and Marine 4	0.35	0.60	NR	38	20 or 13+5 ^h	13/17	30 ^g	10/13	10, 2 ft	10/13
6	0.35	0.60	NR	49	20 or 13+5 ^h	15/19	30 ^g	15/19	10, 4 ft	10/13
7 and 8	0.35	0.60	NR	49	21	19/21	38 ^g	15/19	10, 4 ft	10/13

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Compliance Path – Prescriptive

- Mandatory notes
- Insulation schedule
- Building Sections specifying insulation
- High-efficacy lighting

Efficiency Schedule

Energy Details - Climate Zone 4	
2009 IECC Compliance - Prescriptive	
Basement Walls	2x4 with R-13 cav. (FB)
Above Grade Walls	2x6 with R-20 cav (BC)
Floor Over Garage	11.875" TJ with R-43 cav (BC)
Ceiling - Attic	R-50 (BC)
Windows	All U-Factors equal or below 0.30
Lighting	75% or more to be CFL

FB - Fiberglass Batt (R-3.7/inch)

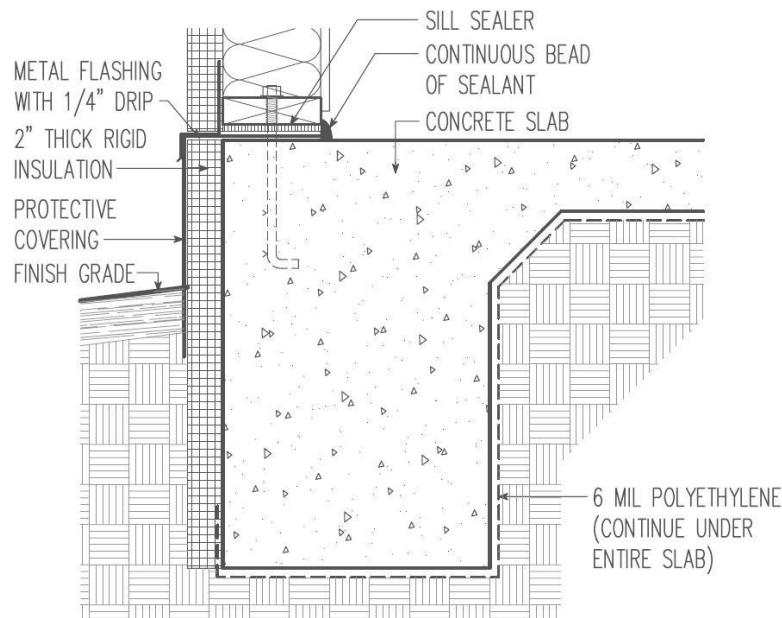
BC - Blown Cellulose (R-3.66/inch)

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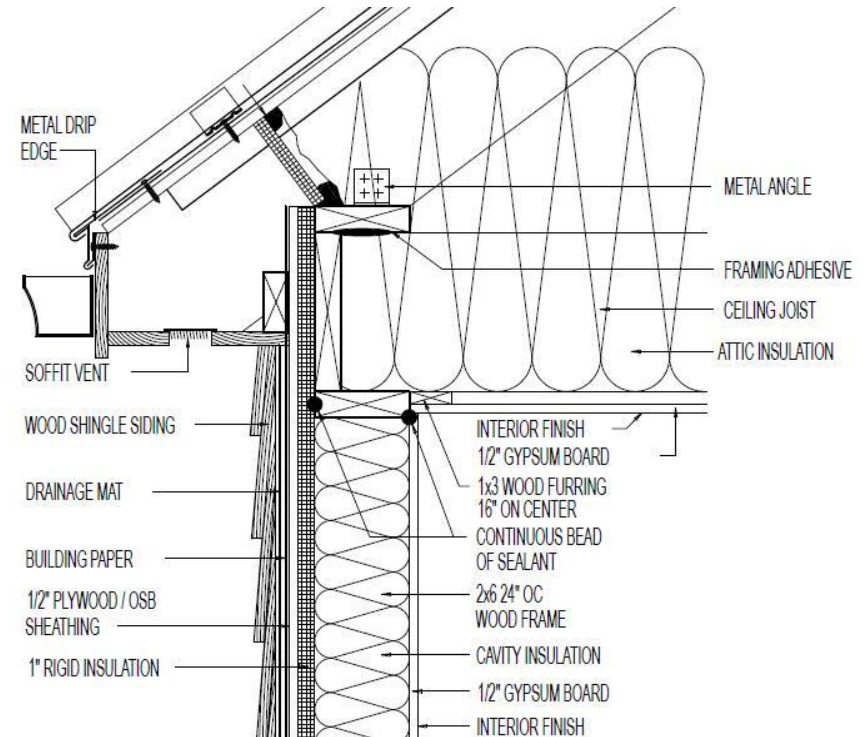
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Compliance Path – Prescriptive

Example Building Sections



Foundation/floor connection



Wall/roof connection

<http://www.greenbuildingadvisor.com>

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Compliance

Mandatory Provisions

AND

A. Prescriptive

B.1 U-Factor

B.2 UA Alternative

C. Simulated Performance Alternative

Prescriptive Approaches

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Compliance Path – U-Factor

- U-factors dependent on climate zone
- Alternative to the R-value in Table 402.1.1
- *Equivalent U-Factors* [Table 402.1.3]
- Could cite values directly from code
- Can use software for help with basic U-Factor calculations
- No trade offs

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Compliance Path – U-Factor

TABLE 402.1.3
EQUIVALENT *U*-FACTORS^a

CLIMATE ZONE	FENESTRATION <i>U</i> -FACTOR	SKYLIGHT <i>U</i> -FACTOR	CEILING <i>U</i> -FACTOR	FRAME WALL <i>U</i> -FACTOR	MASS WALL <i>U</i> -FACTOR ^b	FLOOR <i>U</i> -FACTOR	BASEMENT WALL <i>U</i> -FACTOR	CRAWL SPACE WALL <i>U</i> -FACTOR ^c
1	1.20	0.75	0.035	0.082	0.197	0.064	0.360	0.477
2	0.65	0.75	0.035	0.082	0.165	0.064	0.360	0.477
3	0.50	0.65	0.035	0.082	0.141	0.047	0.091 ^c	0.136
4 except Marine	0.35	0.60	0.030	0.082	0.141	0.047	0.059	0.065
5 and Marine 4	0.35	0.60	0.030	0.057	0.082	0.033	0.059	0.065
6	0.35	0.60	0.026	0.057	0.060	0.033	0.050	0.065
7 and 8	0.35	0.60	0.026	0.057	0.057	0.028	0.050	0.065

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Compliance Path – U-Factor

- Mandatory notes
- Insulation schedule
- Wall Sections specifying insulation
- High-efficacy lighting

Efficiency Schedule

Energy Details - Climate Zone 4	
2009 IECC Compliance - Prescriptive/U-Factor	
Basement Walls	2x4 with R-13 cav (FB)
Above Grade Walls	2x4 with empty cav and 2" of PI Foam on exterior [U-Factor - 0.059]
Floor Over Garage	11.875" TJ with R-43 cav (BC)
Ceiling - Attic	R-50 (BC)
Windows	All U-Factors equal or below 0.30
Lighting	75% or more to be CFL

FB - Fiberglass Batt (R-3.7/inch)

BC - Blown Cellulose (R-3.66/inch)

PI - Polyisocyanurate Rigid Foam (R-6.25/inch)

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Break

- 15 minutes
- We're going to start topic 2 again at _____



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Compliance

Mandatory Provisions

AND

- A. Prescriptive
- B.1 U-Factor
- B.2 UA Alternative
- C. Simulated Performance Alternative

Prescriptive Approaches

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Compliance Path – UA Alternative

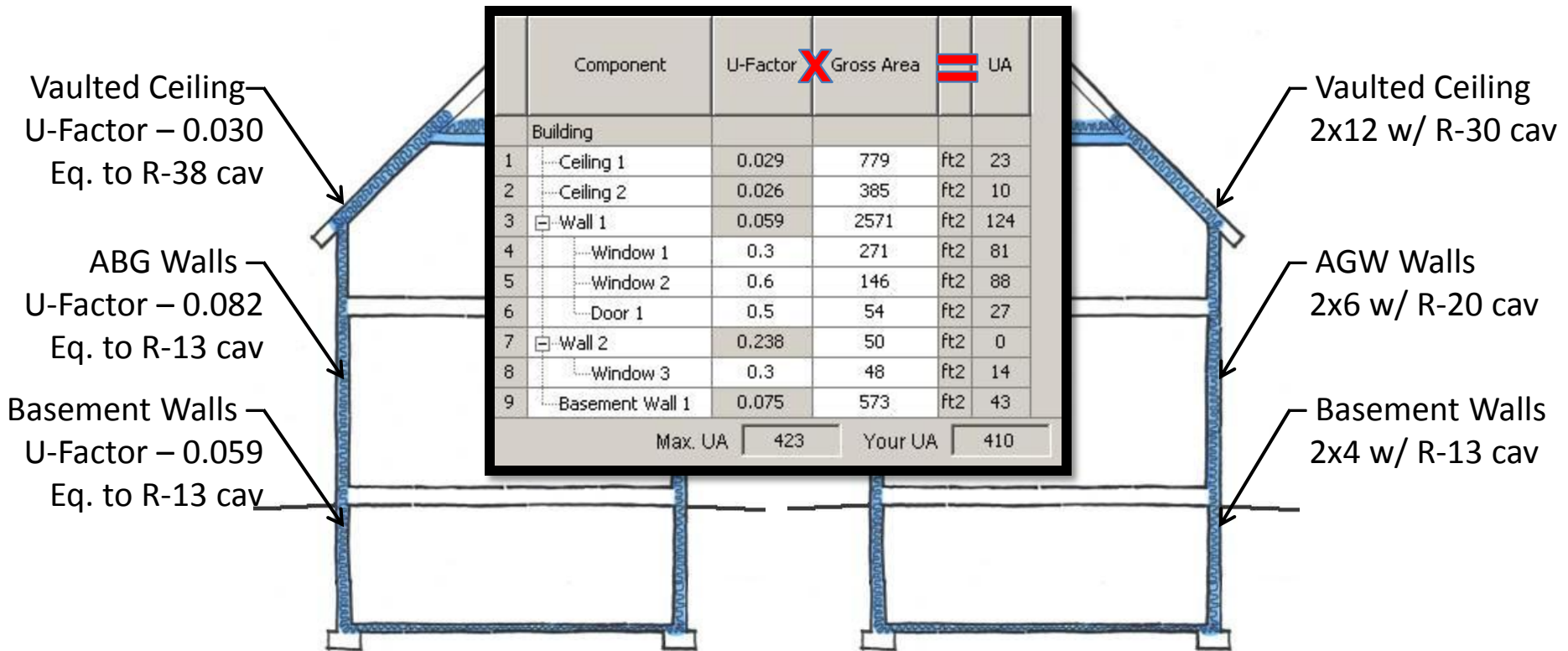
Total UA Alternative [402.1.4]

- Total UA is the sum of all the construction type areas multiplied by their respective U-factor
- Allows for trade offs between different portions of building envelope
- There is a hard limit on trade-offs
 - Area-weighted U-Factor of windows must be 0.48 or less
- REScheck – Department of Energy

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Compliance Path – UA Alternative



Max UA



Design UA

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Compliance Path – UA Alternative

Missouri_Home_UA.rck - REScheck 4.4.2 Code: 2009 IECC

File Edit View Options Code Tools Help

Project Envelope Mechanical

Location

State

City

Project Type

☒ New Construction ☐ Addition/Alteration

Building Characteristics

☒ 1- and 2-Family, Detached ☐ Multifamily

Conditioned Floor Area ft²

☒ All ducts and air handlers located within conditioned spaces

[Explanation of duct testing requirements...](#)

Project Details (optional)

This information will appear on the compliance certificate. [Edit Project Details...](#)

Title/Site/Permit

Jefferson City Home
1234 ABC Lane
Jefferson City, MO 65101

Owner/Agent

Designer/Contractor

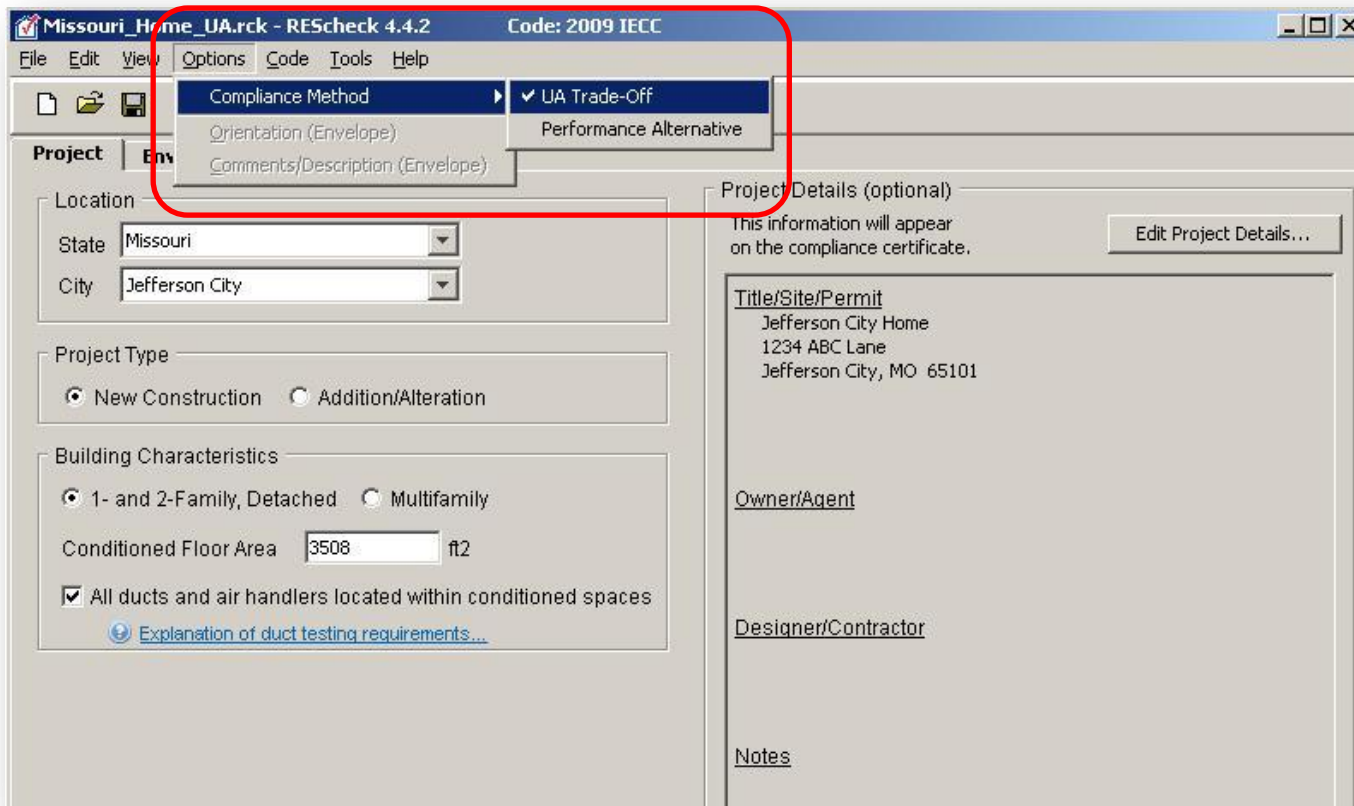
Notes



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MISSOURI DEPARTMENT OF NATURAL RESOURCES

Compliance Path – UA Alternative



Missouri_Home_UA.rck - REScheck 4.4.2 Code: 2009 IECC

File Edit View Options Code Tools Help

Compliance Method ▾
Orientation (Envelope)
Comments/Description (Envelope)

✓ UA Trade-Off
Performance Alternative

Project Env

Location

State Missouri

City Jefferson City

Project Type

☒ New Construction ☐ Addition/Alteration

Building Characteristics

☒ 1- and 2-Family, Detached ☐ Multifamily

Conditioned Floor Area 3508 ft2

☒ All ducts and air handlers located within conditioned spaces

[Explanation of duct testing requirements...](#)

Project Details (optional)

This information will appear on the compliance certificate. Edit Project Details...

Title/Site/Permit
Jefferson City Home
1234 ABC Lane
Jefferson City, MO 65101

Owner/Agent

Designer/Contractor

Notes



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MISSOURI DEPARTMENT OF NATURAL RESOURCES

Compliance Path – UA Alternative

Missouri_Home_UA.rck - REScheck 4.4.2 Code: 2009 IECC

File Edit View Options Code Tools Help

Project **Envelope** Mechanical

Ceiling Skylight Wall Window Door Basement Floor Crawl Wall

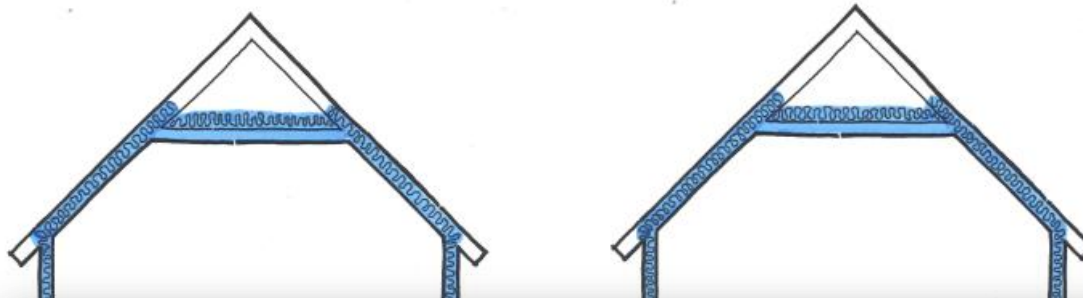
	Component	Assembly	Gross Area		Cavity Insulation R-Value	Continuous Insulation R-Value	U-Factor	UA	SHGC	Wall Height (ft)
	Building									
1	Ceiling 1	Cathedral Ceiling	779	ft2	30.0	5.0	0.029	23		
2	Ceiling 2	Flat Ceiling or Scissor Truss	385	ft2	25.0	13.0	0.026	10		
3	Wall 1	Wood Frame, 16" o.c.	2571	ft2	20.0	0.0	0.059	124		
4	Window 1	Wood Frame:Double Pan...	271	ft2			0.3	81	0.40	
5	Window 2	Wood Frame:Double Pan...	146	ft2			0.6	88	0.50	
6	Door 1	Solid	54	ft2			0.5	27		
7	Wall 2	Wood Frame, 16" o.c.	50	ft2	0.0	0.0	0.238	0		
8	Window 3	Wood Frame:Double Pan...	48	ft2			0.3	14	0.40	
9	Basement Wall 1	Solid Concrete or Masonry	573	ft2	13.0	0.0	0.075	43		7.0



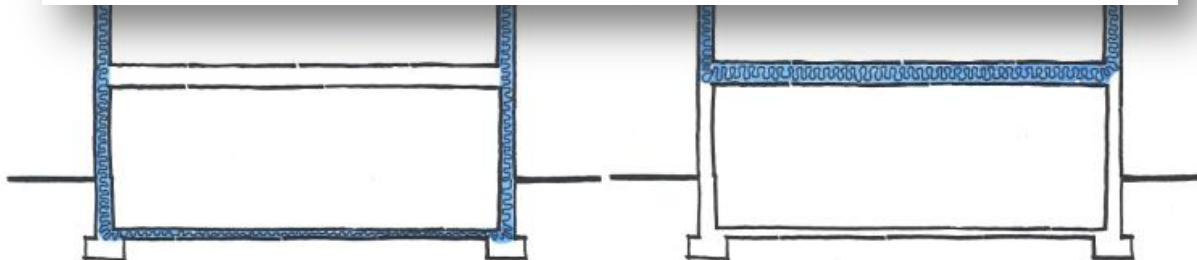
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Compliance Path – UA Alternative



CONDITIONED SPACE. An area or room within a building being heated or cooled, containing uninsulated ducts, or with a fixed opening directly into an adjacent *conditioned space*.



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Compliance Path – UA Alternative



Missouri_Home_UA.rck - REScheck 4.4.2 Code: 2009 IECC

File Edit View Options Code Tools Help

Project Envelope Mechanical

Ceiling Skylight Wall Window Door Basement Floor Crawl Wall

	Component	Assembly	Gross Area		Cavity Insulation R-Value	Continuous Insulation R-Value	U-Factor	UA	SHGC	Wall Height (ft)	Depth Below Grade (ft)	Depth of Insulation (ft)
Building												
1	Ceiling 1	Cathedral Ceiling	779	ft2	30.0	5.0	0.029	23				
2	Ceiling 2	Flat Ceiling or Scissor Truss	385	ft2	25.0	13.0	0.026	10				
3	Wall 1	Wood Frame, 16" o.c.	2571	ft2	20.0	0.0	0.059	124				
4	Window 1	Wood Frame:Double Pan...	271	ft2			0.3	81	0.40			
5	Window 2	Wood Frame:Double Pan...	146	ft2			0.6	88	0.50			
6	Door 1	Solid	54	ft2			0.5	27				

Passes 3.1 % Better Than Code

Compliance Method: UA Trade-Off Max. UA 423 Your UA 410

Passes 3.1 % Better Than Code

Compliance Method: UA Trade-Off Max. UA 423 Your UA 410



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MISSOURI DEPARTMENT OF NATURAL RESOURCES

Compliance Path – UA Alternative

Missouri_Home_UA.rck - REScheck 4.4.2 Code: 2009 IECC

File Edit View Options Code Tools Help

Project Envelope Mechanical

Ceiling Skylight Wall Window Door Basement Floor Crawl Wall

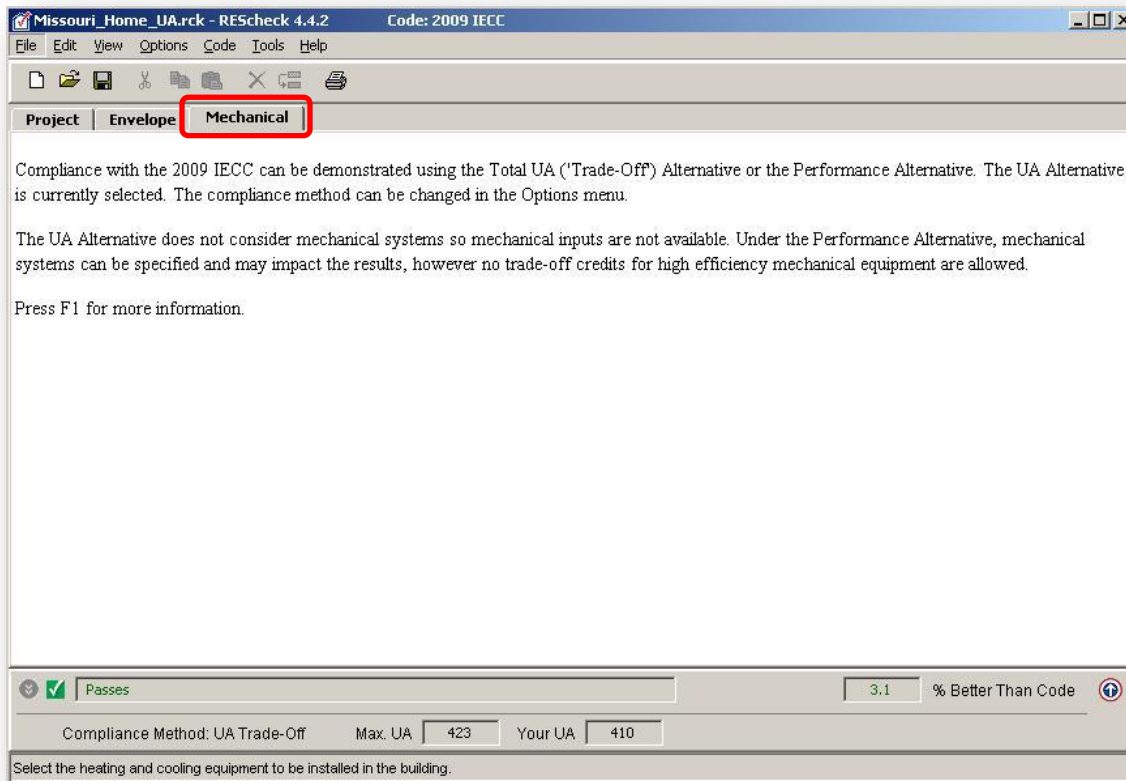
	Component	Assembly	Gross Area		Cavity Insulation R-Value	Continuous Insulation R-Value	U-Factor	UA	SHGC	Wall Height (ft)	Depth Below Grade (ft)	Depth of Insulation (ft)
	Building											
1	Ceiling 1	Cathedral Ceiling	779	ft2	30.0	5.0	0.029	23				
2	Ceiling 2	Flat Ceiling or Scissor Truss	385	ft2	25.0	13.0	0.026	10				
3	Wall 1	Wood Frame, 16" o.c.	2571	ft2	20.0	0.0	0.059	124				
4	Window 1	Wood Frame:Double Pan...	271	ft2			0.3	81	0.40			
5	Window 2	Wood Frame:Double Pan...	146	ft2			0.6	88	0.50			
6	Door 1	Solid	54	ft2			0.5	27				
7	Wall 2	Wood Frame, 16" o.c.	50	ft2	0.0	0.0	0.238	0				
8	Window 3	Wood Frame:Double Pan...	48	ft2			0.3	14	0.40			
9	Basement Wall 1	Solid Concrete or Masonry	573	ft2	13.0	0.0	0.075	43		7.0	3.5	7.0



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Compliance Path – UA Alternative



The screenshot shows the REScheck 4.4.2 software window. The title bar reads "Missouri_Home_UA.rck - REScheck 4.4.2" and "Code: 2009 IECC". The menu bar includes File, Edit, View, Options, Code, Tools, and Help. The toolbar contains icons for file operations and simulation. The "Mechanical" tab is selected and highlighted with a red rectangle. The main text area contains the following information:

Compliance with the 2009 IECC can be demonstrated using the Total UA ("Trade-Off") Alternative or the Performance Alternative. The UA Alternative is currently selected. The compliance method can be changed in the Options menu.

The UA Alternative does not consider mechanical systems so mechanical inputs are not available. Under the Performance Alternative, mechanical systems can be specified and may impact the results, however no trade-off credits for high efficiency mechanical equipment are allowed.

Press F1 for more information.

The status bar at the bottom shows a green checkmark icon, a "Passes" label, a "3.1" value, and a "% Better Than Code" label. Below this, it displays "Compliance Method: UA Trade-Off", "Max. UA 423", and "Your UA 410". At the very bottom, it says "Select the heating and cooling equipment to be installed in the building."



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MISSOURI DEPARTMENT OF NATURAL RESOURCES

Compliance Path – UA Alternative

Missouri_Home_UA.rck - REScheck 4.4.2 Code: 2009 IECC

File Edit View Options Code Tools Help

Project Envelope Mechanical

Location

State: Missouri

City: Jefferson City

Project Type

☒ New Construction ☐ Addition/Alteration

Building Characteristics

☒ 1- and 2-Family, Detached ☐ Multifamily

Conditioned Floor Area: 3508 ft2

☒ All ducts and air handlers located within conditioned space

[Explanation of duct testing requirements...](#)

Project Details (optional)

This information will appear on the compliance certificate. [Edit Project Details...](#)

Title/Site/Permit

Jefferson City Home
1234 ABC Lane
Jefferson City, MO 65101

View / Print Report

Select Report Options

☒ Compliance Certificate

☒ Inspection Checklist

☒ Panel Certificate

OK Cancel

Notes



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MISSOURI DEPARTMENT OF NATURAL RESOURCES

Compliance Path – UA Alternative

**REScheck Software Version 4.4.2**
Compliance Certificate

Project Title: Jefferson City Home

Energy Code: 2009 IECC
Location: Jefferson City, Missouri
Construction Type: Single Family
Glazing Area Percentage: 18%
Heating Degree Days: 5302
Climate Zone: 4

Construction Site: 1234 ABC Lane
Jefferson City, MO 65101

Owner/Agent: Designer/Contractor:

Compliance: Passes using UA trade-off

Compliance: 3.1% Better Than Code Maximum UA: 423 Your UA: 410

The % Better or Worse Than Code index reflects how close to compliance the house is based on code trade-off rules.
It DOES NOT provide an estimate of energy use or cost relative to a minimum-code home.

Assembly	Gross Area or Perimeter	Cavity R-Value	Cont. R-Value	Glazing or Door U-Factor	UA
Ceiling 1: Cathedral Ceiling	779	30.0	5.0		23
Ceiling 2: Flat Ceiling or Scissor Truss	385	25.0	13.0		10
Wall 1: Wood Frame, 16" o.c.	2571	20.0	0.0		124
Window 1: Wood Frame:Double Pane with Low-E	271			0.300	81
Window 2: Wood Frame:Double Pane with Low-E	146			0.600	88
Door 1: Solid	54			0.500	27
Wall 2: Wood Frame, 16" o.c.	50	0.0	0.0		0
Window 3: Wood Frame:Double Pane with Low-E	48			0.300	14
Basement Wall 1: Solid Concrete or Masonry	573	13.0	0.0		43
Wall height: 7.0'					
Depth below grade: 3.5'					
Insulation depth: 7.0'					

Compliance Statement: The proposed building design described here is consistent with the building plans, specifications, and other calculations submitted with the permit application. The proposed building has been designed to meet the 2009 IECC requirements in REScheck Version 4.4.2 and to comply with the mandatory requirements listed in the REScheck Inspection Checklist.



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MISSOURI DEPARTMENT OF NATURAL RESOURCES

Compliance Path – UA Alternative



REScheck Software Version 4.4.2
Inspection Checklist

Ceilings:

- ☐ Ceiling 1: Cathedral Ceiling, R-30.0 cavity + R-5.0 continuous insulation

Comments: _____

- ☐ Ceiling 2: Flat Ceiling or Scissor Truss, R-25.0 cavity + R-13.0 continuous insulation

Comments: _____

Above-Grade Walls:

- ☐ Wall 1: Wood Frame, 16" o.c., R-20.0 cavity insulation

Comments: _____

- ☐ Wall 2: Wood Frame, 16" o.c., R-0 (uninsulated)

Comments: _____

Basement Walls:

- ☐ Basement Wall 1: Solid Concrete or Masonry, 7.0' ht / 3.5' bg / 7.0' insul, R-13.0 cavity insulation

Comments: _____

Windows:

- ☐ Window 1: Wood Frame:Double Pane with Low-E, U-factor: 0.300

For windows without labeled U-factors, describe features:

#Panes _____ Frame Type _____ Thermal Break? _____ Yes _____ No

Comments: _____

- ☐ Window 2: Wood Frame:Double Pane with Low-E, U-factor: 0.600

For windows without labeled U-factors, describe features:

#Panes _____ Frame Type _____ Thermal Break? _____ Yes _____ No

Comments: _____

- ☐ Window 3: Wood Frame:Double Pane with Low-E, U-factor: 0.300

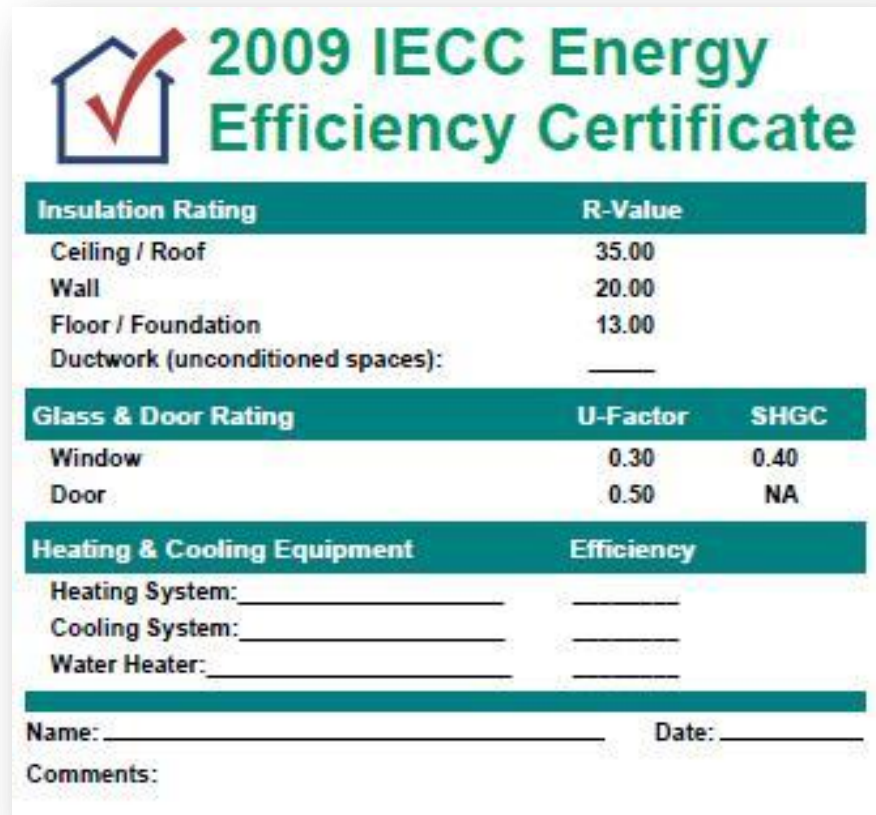
For windows without labeled U-factors, describe features:



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Compliance Path – UA Alternative



2009 IECC Energy Efficiency Certificate

Insulation Rating	R-Value
Ceiling / Roof	35.00
Wall	20.00
Floor / Foundation	13.00
Ductwork (unconditioned spaces):	_____

Glass & Door Rating	U-Factor	SHGC
Window	0.30	0.40
Door	0.50	NA

Heating & Cooling Equipment	Efficiency
Heating System: _____	_____
Cooling System: _____	_____
Water Heater: _____	_____

Name: _____ Date: _____

Comments: _____



This document or a similar one needs to be installed near the main electrical panel



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Compliance

Mandatory Provisions

AND

A. Prescriptive

B.1 U-Factor

B.2 UA Alternative

C. Simulated Performance Alternative

Prescriptive Approaches

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MISSOURI DEPARTMENT OF NATURAL RESOURCES

Compliance Path – Simulated Performance

- Simulated performance analysis
 - Heating, cooling, service water heating energy only
- Design shown to have less than or equal to annual energy cost of standard reference design [405.3]
- Standard reference design [Table 405.5.2(1)]

TABLE 405.5.2(1)
SPECIFICATIONS FOR THE STANDARD REFERENCE AND PROPOSED DESIGNS

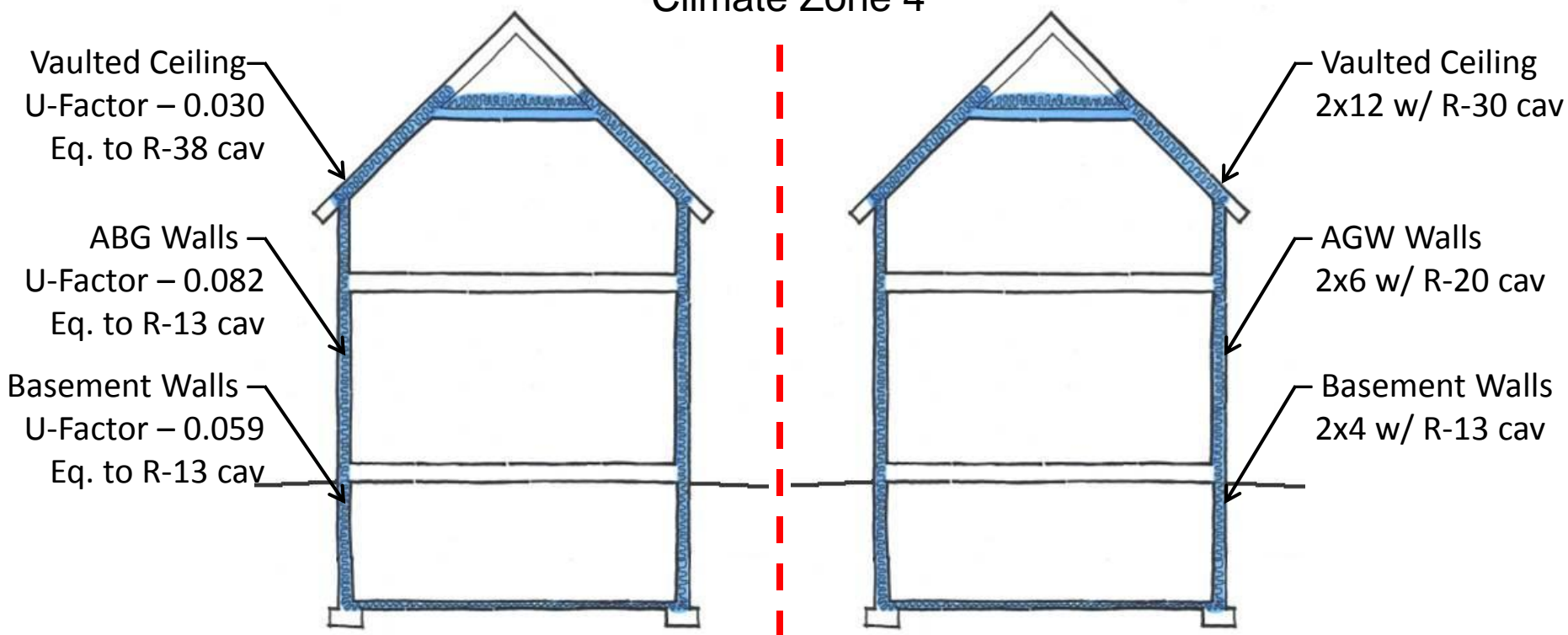
BUILDING COMPONENT	STANDARD REFERENCE DESIGN	PROPOSED DESIGN
Above-grade walls	Type: mass wall if proposed wall is mass; otherwise wood frame. Gross area: same as proposed <i>U</i> -factor: from Table 402.1.3 Solar absorptance = 0.75 Emittance = 0.90	As proposed As proposed As proposed As proposed As proposed
Basement and crawl space walls	Type: same as proposed Gross area: same as proposed <i>U</i> -factor: from Table 402.1.3, with insulation layer on interior side of walls.	As proposed As proposed As proposed
Above-grade floors	Type: wood frame Gross area: same as proposed <i>U</i> -factor: from Table 402.1.3	As proposed As proposed As proposed
Ceilings	Type: wood frame Gross area: same as proposed <i>U</i> -factor: from Table 402.1.3	As proposed As proposed As proposed
	Type: composition shingle on wood sheathing Gross area: same as proposed	As proposed As proposed

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Compliance Path – Simulated Performance

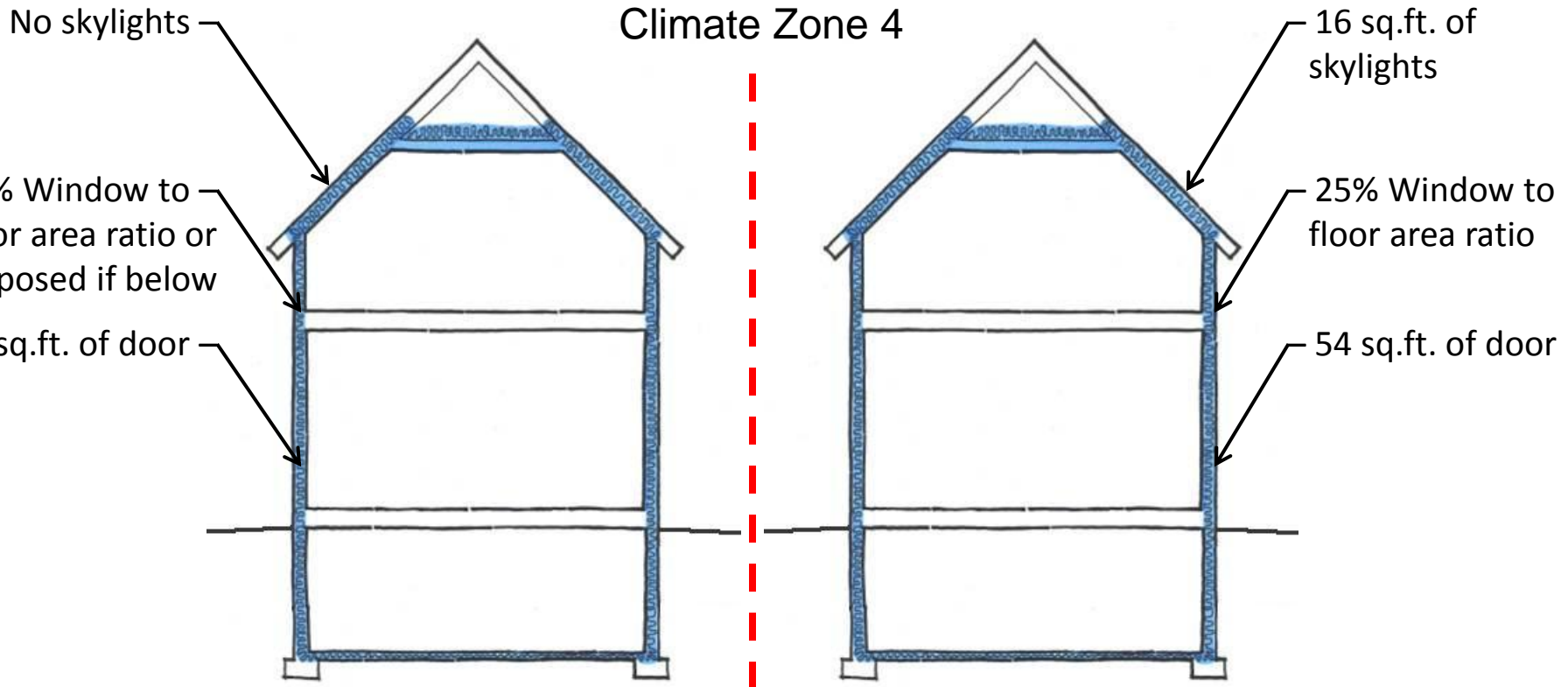
Climate Zone 4



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Compliance Path – Simulated Performance



Reference Design
2009 IECC



Proposed Design

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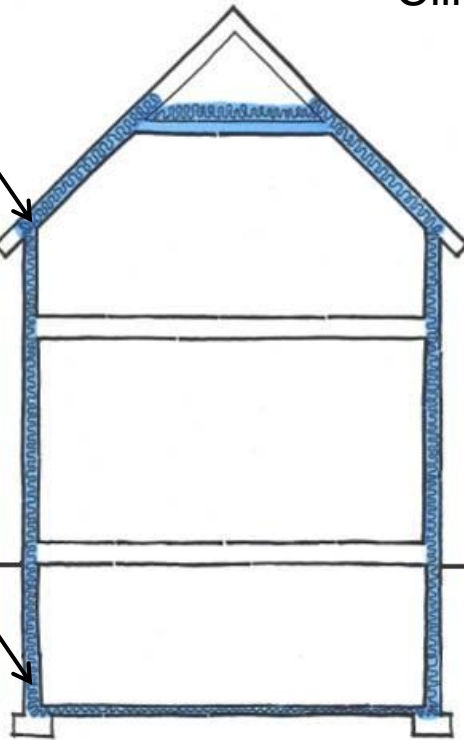
MISSOURI DEPARTMENT OF NATURAL RESOURCES

Compliance Path – Simulated Performance

Climate Zone 4

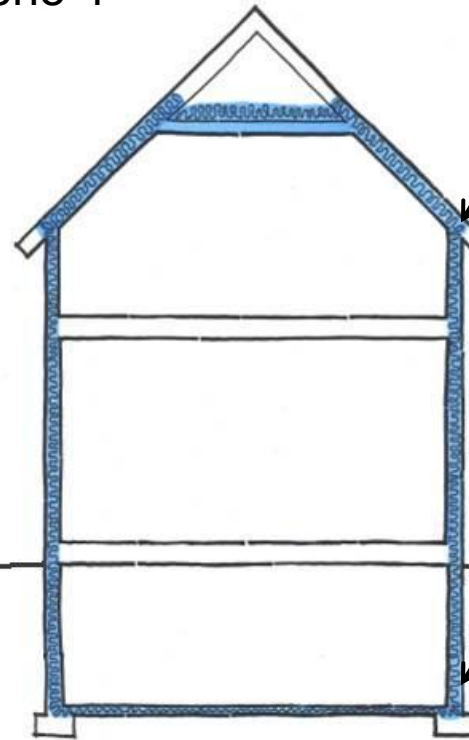
ACH of
0.00036 SLA

Mechanical
same as proposed



ACH not tested
then same as
reference OR
actual value down
to 0.35 OR
actual value if
mechanically
ventilated

Mechanical as
proposed



Reference Design
2009 IECC



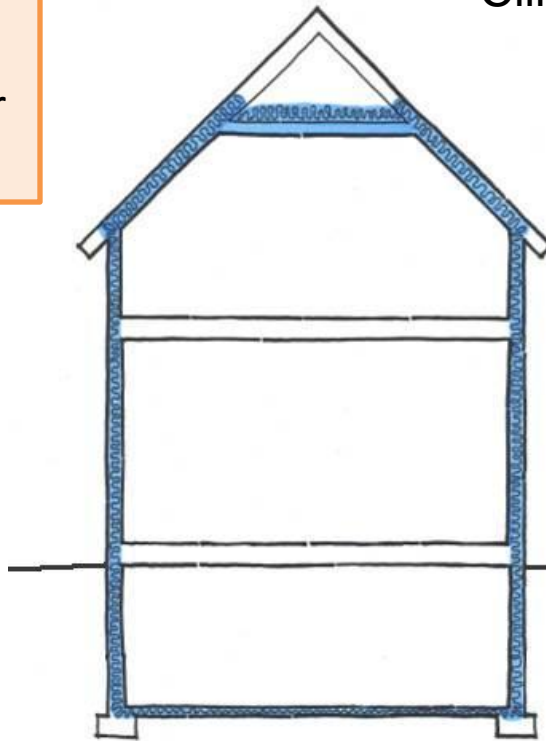
Proposed Design

ENERGIZE MISSOURI

MISSOURI DEPARTMENT OF NATURAL RESOURCES

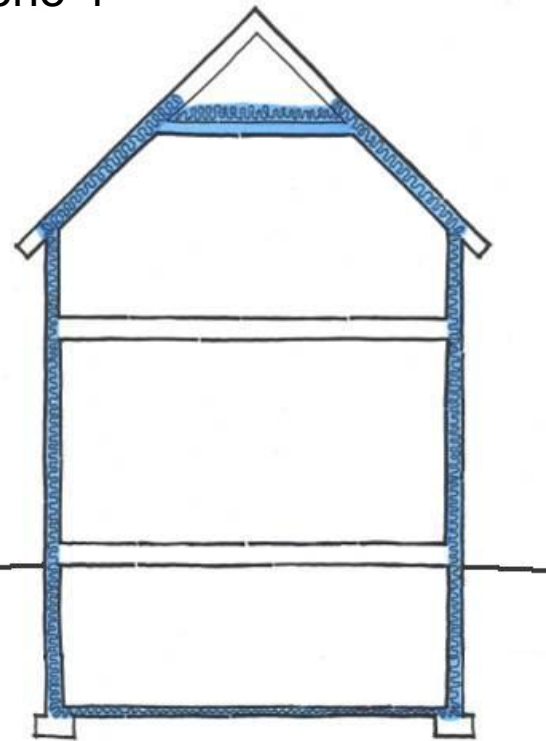
Compliance Path – Simulated Performance

Heat
+ Cool
+ Hot Water
= \$917



Climate Zone 4

Heat
+ Cool
+ Hot Water
= \$770



Reference Design
2009 IECC



Proposed Design

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Compliance Path – Simulated Performance

Differences between UA and Performance

- Performance takes into consideration weather
- Performance does not require 50% high efficacy lighting
- Performance allows for R-6 duct insulation, instead of R-8 for supply ducts
- Performance has limits to doors and windows
 - Glass house could be compliant in the prescriptive paths but not compliant in the performance path

Main Software

- REScheck
- REM/Design or REM/Rate (considers air infiltration and duct tightness)

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MISSOURI DEPARTMENT OF NATURAL RESOURCES

Compliance Path – Simulated Performance

Missouri_Home_Performance.rck - REScheck 4.4.2 Code: 2009 IECC

File Edit View Options Code Tools Help

Compliance Method ☒ UA Trade-Off
Performance Alternative

Orientation (Envelope)
Comments/Description (Envelope)

Project Env

Location

State

City

Project Type

☒ New Construction ☐ Addition/Alteration

Building Characteristics

☒ 1- and 2-Family, Detached ☐ Multifamily

Conditioned Floor Area ft2

☒ All ducts and air handlers located within conditioned spaces

[Explanation of duct testing requirements...](#)

Project Details (optional)

This information will appear on the compliance certificate. [Edit Project Details...](#)

Title/Site/Permit
Jefferson City Home
1234 ABC Lane
Jefferson City, MO 65101

Owner/Agent

Designer/Contractor

Notes



ENERGIZE MISSOURI

MISSOURI DEPARTMENT OF NATURAL RESOURCES

Compliance Path – Simulated Performance

Missouri_Home_Performance.rck - REScheck 4.4.2 Code: 2009 IECC

File Edit View Options Code Tools Help

Project Envelope Mechanical

Location
State: Missouri
City: Jefferson

Project Details (optional)
This information will appear in the Project Details...

2009 IECC Performance Alternative Information

Compliance with the 2009 IECC can be demonstrated using the Total UA Alternative (Section 402.1.4), or the Performance Alternative (Section 405). However, neither of these alternatives allow credit for high efficiency mechanical equipment.

The performance alternative is based on the simulated performance of your proposed building as compared to an equivalent code building. Both simulations are based on the proposed mechanical equipment efficiency that you enter. The compliance index may not always seem consistent with changes you make in equipment efficiency due to the complex interactions between the building envelope (including window SHGCs and U-factors), the building and wall orientation, and mechanical equipment efficiency.

Using the performance alternative requires additional inputs including conditioned floor area, orientation of the building, a minimum of four walls having unique orientations, and a minimum of one roof and floor.

Press 'F1' or see Help for additional information.

Help OK

Passes

3.1 % Better Than Code

Compliance Method: UA Trade-Off Max. UA 423 Your UA 410

Select the building's location and construction type.



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MISSOURI DEPARTMENT OF NATURAL RESOURCES

Compliance Path – Simulated Performance

Missouri Home Performance.rck - REScheck 4.4.2 Code: 2009 IECC

File Edit View Options Code Tools Help

Front Faces: East

Project Envelope Mechanical

Ceiling Skylight Wall Window Door Basement Floor Crawl Wall

	Component	Assembly	Orientation	Gross Area		Cavity Insulation R-Value	Continuous Insulation R-Value	U-Factor	UA	SHGC	Wall Height (ft)	Depth Below Grade (ft)	Depth of Insulation (ft)
Building													
1	Ceiling 1	Cathedral Ceiling		779	ft2	30.0	5.0	0.029	23				
2	Ceiling 2	Flat Ceiling or Scissor Truss		385	ft2	25.0	13.0	0.026	10				
3	Wall 2	Wood Frame, 16" o.c.	Left Side	50	ft2	0.0	0.0	0.238	0				
4	Window 3	Wood Frame:Double Pan...	Left Side	48	ft2			0.3	14	0.40			
5	Wall 1	Wood Frame, 16" o.c.	Front	429	ft2	20.0	0.0	0.059	18				
6	Window 1	Wood Frame:Double Pan...	Front	100	ft2			0.3	30	0.30			
7	Door 1	Solid	Front	20	ft2			0.3	6				
8	Wall 1 copy 1	Wood Frame, 16" o.c.	Back	429	ft2	20.0	0.0	0.059	18				
9	Window 1 copy	Wood Frame:Double Pan...	Back	100	ft2			0.3	30	0.30			
10	Door 1 copy 1	Solid	Back	20	ft2			0.3	6				
11	Wall 1 copy 2	Wood Frame, 16" o.c.	Right Side	857	ft2	20.0	0.0	0.059	44				
12	Window 1 copy	Wood Frame:Double Pan...	Right Side	73	ft2			0.35	26	0.40			
13	Window 1 copy	Wood Frame:Double Pan...	Right Side	35	ft2			0.3	11	0.30			
14	Wall 1 copy 3	Wood Frame, 16" o.c.	Left Side	857	ft2	20.0	0.0	0.059	43				
15	Window 1 copy	Wood Frame:Double Pan...	Left Side	73	ft2			0.35	26	0.40			
16	Window 1 copy	Wood Frame:Double Pan...	Left Side	35	ft2			0.3	11	0.30			
17	Door 1 copy 2	Solid	Left Side	20	ft2			0.3	6				
18	Basement Wall 1	Solid Concrete or Masonry	Front	96	ft2	13.0	0.0	0.075	7		7.0	3.5	7.0
19	Basement Wall 1 c	Solid Concrete or Masonry	Back	96	ft2	13.0	0.0	0.075	7		7.0	3.5	7.0
20	Basement Wall 1 c	Solid Concrete or Masonry	Right Side	190	ft2	13.0	0.0	0.075	14		7.0	3.5	7.0
21	Basement Wall 1 c	Solid Concrete or Masonry	Left Side	190	ft2	13.0	0.0	0.075	14		7.0	3.5	7.0

Check Compliance

TBD %

Compliance method: Performance Alternative

Explanation of results...



ENERGIZE MISSOURI

MISSOURI DEPARTMENT OF NATURAL RESOURCES

Compliance Path – Simulated Performance

Missouri_Home_Performance.rck - REScheck 4.4.2 Code: 2009 IECC

File Edit View Options Code Tools Help

Front Faces: East

Project		Envelope		Mechanical															
		Ceiling	Skylight	Wall	Window	Door	Basement	Floor	Crawl Wall										
	Component	Assembly	Orientation	Gross Area	Cavity Insulation R-Value	Continuous Insulation R-Value	U-Factor	UA	SHGC	Wall Height (ft)	Depth Below Grade (ft)	Depth of Insulation (ft)							
Building																			
1	Ceiling 1	Cathedral Ceiling		779	ft2	30.0	5.0	0.029	23										
2	Ceiling 2	Flat Ceiling or Scissor Truss		385	ft2	25.0	13.0	0.026	10										
3	Wall 2	Wood Frame, 16" o.c.	Left Side	50	ft2	0.0	0.0	0.238	0										
4	Window 3	Wood Frame:Double Pan...	Left Side	48	ft2		0.3	14	0.40										
5	Wall 1	Wood Frame, 16" o.c.	Front	429	ft2	20.0	0.0	0.059	18										

Passes : Compliance based on performance alternative 5.4 % Better Than Code

Compliance Method: Performance Alternative [Explanation of results...](#)

12	Window 1 copy	Wood Frame:Double Pan...	Right Side	73	ft2		0.35	26	0.40			
13	Window 1 copy	Wood Frame:Double Pan...	Right Side	35	ft2		0.3	11	0.30			
14	Wall 1 copy 3	Wood Frame, 16" o.c.	Left Side	857	ft2	20.0	0.0	0.059	43			
15	Window 1 copy	Wood Frame:Double Pan...	Left Side	73	ft2		0.35	26	0.40			
16	Window 1 copy	Wood Frame:Double Pan...	Left Side	35	ft2		0.3	11	0.30			
17	Door 1 copy 2	Solid	Left Side	20	ft2		0.3	6				
18	Basement Wall 1	Solid Concrete or Masonry	Front	96	ft2	13.0	0.0	0.075	7	7.0	3.5	7.0
19	Basement Wall 1 c	Solid Concrete or Masonry	Back	96	ft2	13.0	0.0	0.075	7	7.0	3.5	7.0
20	Basement Wall 1 c	Solid Concrete or Masonry	Right Side	190	ft2	13.0	0.0	0.075	14	7.0	3.5	7.0
21	Basement Wall 1 c	Solid Concrete or Masonry	Left Side	190	ft2	13.0	0.0	0.075	14	7.0	3.5	7.0

Passes : Compliance based on performance alternative 5.4 % Better Than Code

Compliance Method: Performance Alternative [Explanation of results...](#)



ENERGIZE MISSOURI

MISSOURI DEPARTMENT OF NATURAL RESOURCES

Compliance Path – Simulated Performance



REScheck Software Version 4.4.2 Compliance Certificate



Project Title: Jefferson City Home

Energy Code: 2009 IECC
Location: Jefferson City, Missouri
Construction Type: Single Family
Building Orientation: Bldg. faces 90 deg. from North
Conditioned Floor Area: 3508 ft²
Glazing Area Percentage: 18%
Heating Degree Days: 5302
Climate Zone: 4

Construction Site:
1234 ABC Lane
Jefferson City, MO 65101

Owner/Agent:

Designer/Contractor:

Compliance: Passes using performance alternative

Compliance: 5.4% Better Than Code

Assembly	Gross Area or Perimeter	Cavity R-Value	Cont. R-Value	Glazing or Door U-Factor	UA
Ceiling 1: Cathedral Ceiling	779	30.0	5.0		23
Ceiling 2: Flat Ceiling or Scissor Truss	385	25.0	13.0		10
Wall 1: Wood Frame, 40" x 16"	50	2.0	2.0		2



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MISSOURI DEPARTMENT OF NATURAL RESOURCES

Compliance Path – Simulated Performance

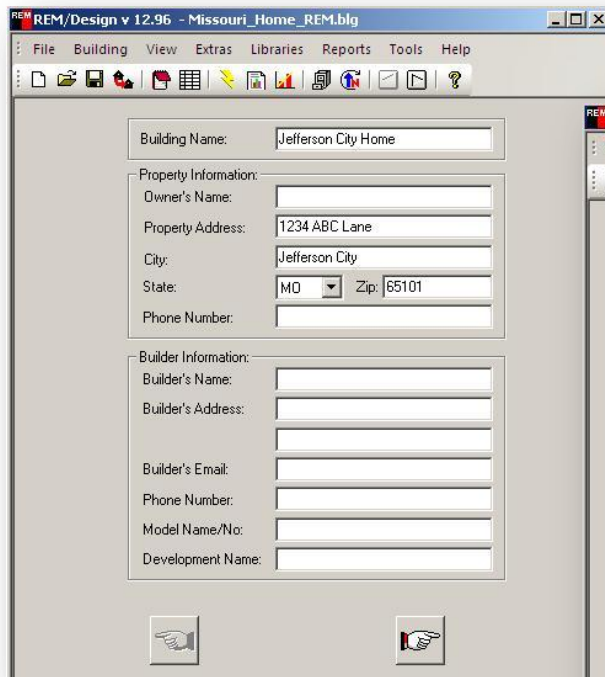
- REScheck [405.6.1] minimum capabilities of the software
- REM/Design or REM/Rate

BEST PRACTICE: Homeowners and Builders should push for a third party inspector or HERS rater that is looking out for the owner, similar to an owner's representative. A HERS rating is the standard that most homes striving for ENERGY STAR or LEED follow and is the standard tool that is currently used to certify tax rebates from the IRS. HERS raters will typically use REM/Rate as their software.

ENERGIZE MISSOURI

MISSOURI DEPARTMENT OF NATURAL RESOURCES

Compliance Path – Simulated Performance



REM/Design v 12.96 - Missouri_Home_REM.blg

File Building View Extras Libraries Reports Tools Help

Building Name: Jefferson City Home

Property Information:

Owner's Name:

Property Address: 1234 ABC Lane

City: Jefferson City

State: MO Zip: 65101

Phone Number:

Builder Information:

Builder's Name:

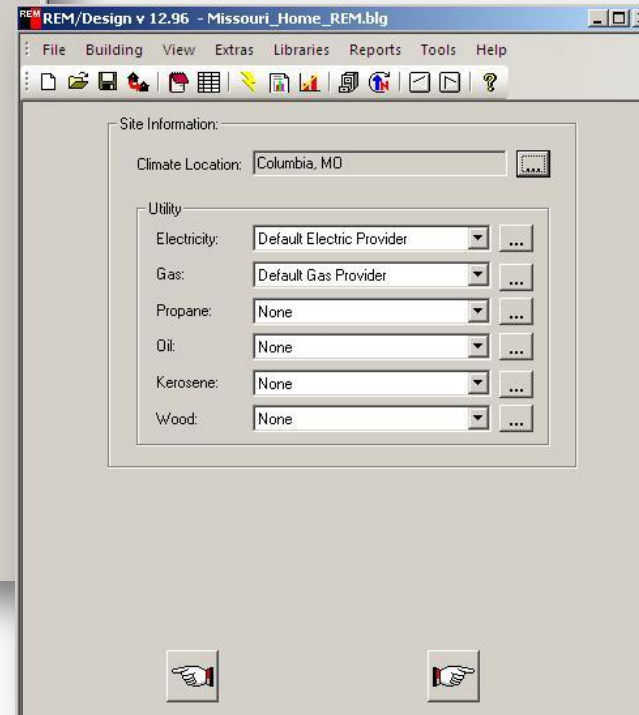
Builder's Address:

Builder's Email:

Phone Number:

Model Name/No:

Development Name:



REM/Design v 12.96 - Missouri_Home_REM.blg

File Building View Extras Libraries Reports Tools Help

Site Information:

Climate Location: Columbia, MO

Utility:

Electricity: Default Electric Provider

Gas: Default Gas Provider

Propane: None

Oil: None

Kerosene: None

Wood: None

REM/Design™

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Compliance Path – Simulated Performance

REM/Design v 12.96 - Missouri_Home_REM.blg

File Building View Extras Libraries Reports Tools Help

Slab Floor Properties Summary

#	Name	Type	Area	Depth	Full Per	Grad...
1	Slab	R-10 Perimeter	1191	3.0	195	0

New Delete Copy

Slab Floor Properties

Name:

Type: R-10.0 Per ...

Area (sq ft): Full Perimeter (ft):

Depth Below Grade (ft): Total Exposed Perimeter (ft):
(0 if on-grade)

On-Grade Exposed Perimeter (ft):

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Compliance Path – Simulated Performance

2009 IECC ANNUAL ENERGY COST COMPLIANCE

REM/Design™

Building Name:	Jefferson City Home	Date:	November 18, 2011
Owner's Name:		Builder's Name:	
Property:	1234 ABC Lane	Weather Site:	Columbia, MO
Address:	Jefferson City, MO 65101	File Name:	Missouri_Home_REM.blg

Annual Energy Cost (\$)

	2009 IECC	As Designed
Heating:	583	493
Cooling:	239	208
Water Heating:	95	70
SubTotal - Used to Determine Compliance:	917	770
Lights & Appliances:	751	751
Photovoltaics:	-0	-0
Service Charge:	120	120
Total:	1788	1641 *

Window U-Factor Check (Section 402.5)

Window U-Factor (Design must be equal or lower):	0.480	0.330
--	-------	-------

Home Infiltration (Section 402.4.2):

PASSES

Duct Leakage (Section 403.2.2):

PASSES

This home MEETS the annual energy cost requirements and verifications of Section 405 of the 2009 International Energy Conservation Code based on a climate zone of 4A. In fact, this home surpasses the requirements by 16.0%.



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Topic 2 Summary

- Difference between the IECC and the IRC in how they pertain to residential buildings
- Applicability of the IECC
- Clarified some points of confusion about the IECC, building and duct tightness, and lighting efficacy
- Discuss compliance paths for applicants to meet the code
 - Actually four paths for compliance

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Topic 3

2009 IECC Resource Inventory



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Topic 3 Objectives

- What is the Resource Inventory?
- How can code officials use the inventory?
- What topics are covered by resources listed in the inventory?
- How can the inventory be maintained over time?

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2009 IECC Resource Inventory

What is it?

- Compilation of resources
- Living document

Residential/ Commercial	Residential/Commercial 2009 IECC	Guide	2009 IECC with commentary	Basic Energy Code definitions from the 2009 IECC with short commentary. Purchase available at this link.	http://www.iccsafe.org/Store/Pages/Product.aspx?id=3810S09
Residential/ Commercial	REScheck and COMcheck	Presentation	Building Energy Codes Online Training	This website provides links to a variety of courses, including information about REScheck, the requirements of the 2009 IECC, etc.	http://www.energycodes.gov/moodle/
Residential/ Commercial	REScheck and COMcheck	Presentation	2009 IECC, REScheck and COMcheck	IECC, REScheck and COMcheck presentation developed by U.S. DOE.	http://www.energycodes.gov/training/pdfs/2009_iecc_rescheck_comcheck.pdf
Residential	Additions and Renovations and the 2009 IECC	Transcript	Residential Requirements of the 2009 IECC	Transcript for a presentation given by the U.S. DOE on the residential requirements of the 2009 IECC (pg. 7 is relevant to additions and renovations).	http://www.energycodes.gov/training/pdfs/2009_iecc_residential_transcript.pdf
Residential	REScheck	Compliance Report	REScheck Compliance Report	Sample REScheck compliance report with sample energy efficiency certificate on pg 5.	http://kwhdesign.net/site/Permit & Construction Documents_files/REScheck.pdf
Residential	Compliance	Frequently-Asked Questions	Frequently-Asked Questions - Module 3 provided by ICC	Frequently-asked questions around the residential energy code; includes answers to questions about the 2009 IECC and roofs, wood-burning fireplaces, windows, thermal envelopes, etc.	http://media.iccsafe.org/geo/docs/FAQ_Module-3.pdf
Residential/ Commercial	General Code Information	Fact Sheet	Policy Maker Fact Sheet, Building Energy Code Compliance; October 2010	One-page tool that provides answers to questions such as: (1) What are energy codes? (2) What are the benefits of building energy codes? (3) What can policy makers do to enhance code compliance and enforcement?	www.imt.org/files/PolicyMakerFactsheet-EnergyCodeCompliance.pdf
Residential/ Commercial	Mechanical	Article	Bigger is not always better with HVAC systems	Article describes why sizing appropriately is of importance, links to article regarding how to size equipment correctly, and to diagrams outlining the mechanical systems covered by the IECC	http://resourcecenter.pnl.gov/cocoon/morf/ResourceCenter/article/136
Residential/ Commercial	Mechanical	Articles, web tools, photos, presentations	Building Codes Energy Resource Center	Numerous sources for information regarding HVAC systems and the IECC. Use "browse topic" drop down menu at upper right to choose "mechanical."	http://resourcecenter.pnl.gov/cocoon/morf/ResourceCenter

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2009 IECC Resource Inventory

Why is it useful?

- Central location
- Sort-able
- Variety of resources
 - Presentations
 - Pamphlets
 - Factsheets
 - Articles
 - Guides
 - Websites

— Reports

— Frequently-asked questions

Sources

— U.S. Department of Energy

— International Code Council

— Other states and municipalities



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High-Level Topics

Topics:

- Code requirements
- REScheck and COMcheck
- Additions/renovations
- Duct pressure testing
- Mechanical systems
- Inspections
- Incentives available

Interpretation questions

- Website:
<http://www.iccsafe.org/cs/Pages/opinions.aspx>
- Phone: 1-888-ICC-SAFE (422-7233)
- ext. 338077

US Department of Energy

- Website:
<http://www.energycodes.gov/help/>



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2009 IECC Resource Inventory

Maintaining the Resource Inventory

- Where will the Resource Inventory “live?”
- Who will update the Resource Inventory?
- Who will have access to the Resource Inventory?



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Topic 3 Summary

- Variety of resources, topics and types
- Using and maintaining the inventory

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Overall Summary

- Topic 1 Awareness of the 2009 IECC
- Topic 2 Highlights of the Residential 2009 IECC
- Topic 3 Resource Inventory
- Questions?



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Next Steps

- Adoption of the 2009 IECC
 - How are current practices different?
 - Obstacles to implementing the code?
 - Solutions?
 - 2012 IECC

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Next Steps

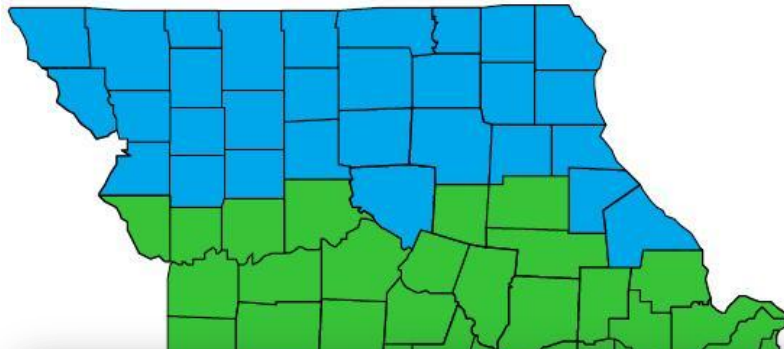
2012 IECC is already published (major changes)

- Prescriptive Items:
 - Increase in Insulation and Fenestration requirements
 - Hot water pipe insulation and length requirements
- Mandatory Items:
 - Air Infiltration test/verification
 - Mechanical ventilation and must be efficient
 - 75% high-efficacy lighting
 - Duct leakage is more stringent for systems outside of conditioned space

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Next Steps



2012 IECC Insulation and Fenestration Requirements

TABLE 402.1.1
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT^a

CLIMATE ZONE	FENESTRATION U-FACTOR ^b	SKYLIGHT ^b U-FACTOR	GLAZED FENESTRATION SHGC ^{b, e}	CEILING R-VALUE	WOOD FRAME WALL R-VALUE	MASS WALL R-VALUE ^f	FLOOR R-VALUE	BASEMENT ^c WALL R-VALUE	SLAB ^d R-VALUE & DEPTH	CRAWL SPACE ^c WALL R-VALUE
4 except Marine	0.35	0.60 0.55	NR 0.40	38 49	20 or 13+5^h 13	8/13 5/10	19	10/13	10, 2 ft	10/13
5 and Marine 4	0.35 0.32	0.60 0.55	NR	38 49	20 or 13+5 ^h	13/17	30 ^g	10/13 15/19	10, 2 ft	10/13 15/19

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Next Steps

Workshop 2

- Discuss Additions and Remodels
 - Applicability
 - Exemptions
- Implementing the code
 - Prior to submittal
 - Plans review process
 - Inspections

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Thank You – comment card

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